PB-248 893

OLD BEN MINE RESERVOIR, FRANKLIN COUNTY, ILLINOIS

Pacific Northwest Environmental Research Laboratory

Prepared for:

National Environmental Research Center

June 1975

DISTRIBUTED BY:

NTIS

National Technical Information Service
U. S. DEPARTMENT OF COMMERCE

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE Report on Old Ben Mine Reservoir, Franklin County, Illinois		5. REPORT DATE Prepared June 1975 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) Anonymous (National Eutrophication Survey Staff)		8. PERFORMING ORGANIZATION REPORT NO. Working Paper # 311
9. PERFORMING ORGANIZATION NAME AND ADDRESS Pacific Northwest Environmental Research Laboratory U.S.Environmental Protection Agency 200 S. W. 35th St. Corvallis, Oregon 97330		10. PROGRAM ELEMENT NO. 1BA029 11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS Office of Research and Development U.S. Environmental Protection Agency 401 M Street, S. W. Washington, DC 20460		13. TYPE OF REPORT AND PERIOD COVERED Final - 1972 14. SPONSORING AGENCY CODE

Reproduced from best available copy.

15. SUPPLEMENTARY NOTES
Prepared in cooperation with the U.S. Environmental Protection Agency, National Environmental Research Center, Las Vegas, Nevada 89114

16. ABSTRACT
Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivded according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
eutrophication lakes nutrients phosphorus nitrogen loading		05B 05C

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report)	21. NO. OF PAGES
Release unlimited		29
	20. SECURITY CLASS (This page)	22. PRICE 4.00

EPA Form 2220-1 (9-73)

026113

PB 248 893

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY

WORKING PAPER SERIES

CORVALLIS ENVIRONMENTAL RESEARCH LABORATORY - CORVALLIS, OREGON
and
ENVIRONMENTAL MONITORING & SUPPORT LABORATORY - LAS VEGAS, NEVADA

G.P.O. 699-440

REPORT
ON
OLD BEN MINE RESERVOIR
FRANKLIN COUNTY
ILLINOIS
EPA REGION V
WORKING PAPER No. 311

WITH THE COOPERATION OF THE
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
AND THE
ILLINOIS NATIONAL GUARD

JUNE, 1975

CONTENTS

	Page
Foreword	ii
List of Illinois Study Lakes	iv
Lake and Drainage Area Map	v
Sections	
I. Introduction	1
II. Conclusions	1
III. Lake and Drainage Basin Characteristics	3
IV. Lake Water Quality Summary	4
V. Nutrient Loadings	8
VI. Literature Reviewed	11
VII. Appendices	12

FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to fresh water lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's fresh water lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the Illinois Environmental Protection Agency for professional involvement and to the Illinois National Guard for conducting the tributary sampling phase of the Survey.

Dr. Richard H. Briceland, Director of the Illinois Environmental Protection Agency; and Ronald M. Barganz, State Survey Coordinator, and John J. Forneris, Manager of Region III, Field Operations Section of the Division of Water Pollution Control, provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports, and provided critiques most useful in the preparation of this Working Paper series.

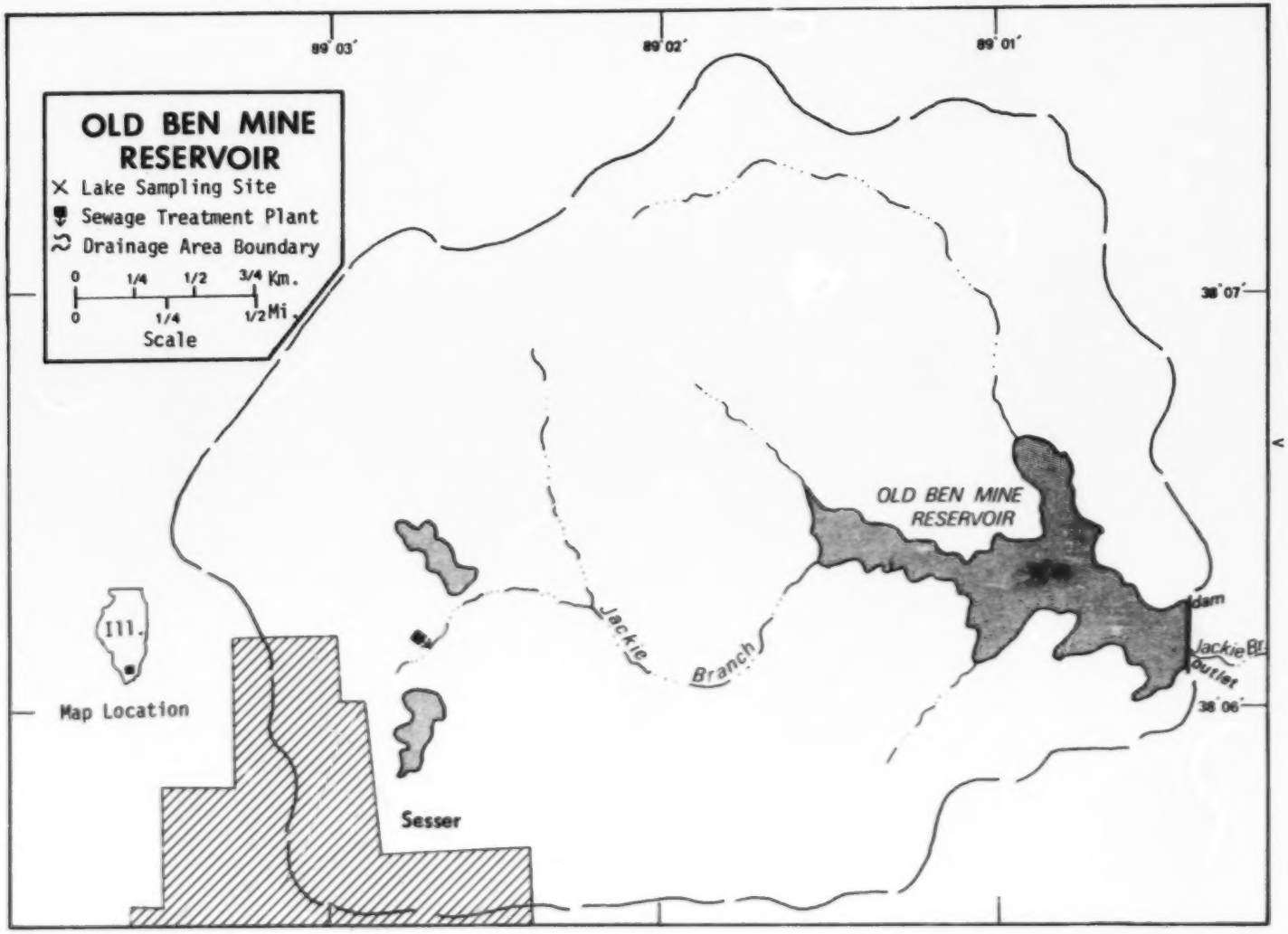
Major General Harold R. Patton, the Adjutant General of Illinois, and Project Officer Colonel Daniel L. Fane, who directed the volunteer efforts of the Illinois National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF ILLINOIS

LAKE NAME	COUNTY
Baldwin	Randolph
Bloomington	McLean
Carlyle	Bond, Clinton, Fayette
Cedar	Lake
Charleston	Coles
Coffeen	Montgomery
Crab Orchard	Jackson, Williamson
Decatur	Macon
DePue	Bureau
East Loon	Lake
Fox	Lake
Grass	Lake
Highland Silver	Madison
Holiday	LaSalle
Horseshoe	Madison
Long	Lake
Lou Yaeger	Montgomery
Marie	Lake
Old Ben Mine	Franklin
Pistakee	Lake, McHenry
Raccoon	Marion
Rend	Franklin, Jefferson
Sangchris	Christian
Shelbyville	Moultrie, Shelby
Slocum	Lake
Springfield	Sangamon
Storey	Knox
Vandalia	Fayette
Vermilion	Vermilion
Wee Ma Tuk	Fulton
Wonder	McHenry


89°03'
89°02'
89°01'
OLD BEN MINE RESERVOIR
Lake Sampling Site
Sewage Treatment Plant
Drainage Area Boundary
0 1/4 1/2 3/4 Km.
0 1/4 1/2 Mi
Scale
38°07'
OLD BEN MINE RESERVOIR
Jackie Branch
dam
Jackie Br.
outlet
38°06'
Ill.
Map Location
Sesser

OLD BEN MINE RESERVOIR

STORET NO. 1765

I. INTRODUCTION

Old Ben Mine Reservoir was included in the National Eutrophication Survey as a water body of interest to the Illinois Environmental Protection Agency. Tributaries and nutrient sources were not sampled, and this report primarily relates to the reservoir sampling data.

II. CONCLUSIONS

A. Trophic Condition:

Survey data indicate that Old Ben Mine Reservoir is eutrophic. It ranked 22nd in overall trophic quality when the 31 Illinois lakes sampled in 1973 were compared using a combination of six lake parameters*. Thirty of the lakes had less median total and dissolved phosphorus, five had less median inorganic nitrogen, 18 had less mean chlorophyll a, and 13 had greater mean Secchi disc transparency. Depression of dissolved oxygen occurred at 1.5 meters in depth in August, 1973.

The Survey limnologists noted floating and emergent macrophytes during all three visits.

B. Rate-Limiting Nutrient:

The algal assay results indicate that the reservoir was nitrogen limited at the time the sample was collected (05/11/73). The

* See Appendix A.

reservoir data indicate nitrogen limitation at the other sampling times as well.

C. Nutrient Controllability:

1. Point sources--The municipal treatment plant at Sesser was the only known phosphorus source impacting the reservoir during the sampling year. A total of 1,925 kg P was estimated to have been contributed by this source and resulted in a point-source loading rate of 4.48 $g/m^2/yr$.

Based on the reservoir data and the data of other Illinois lakes studied, this reservoir exhibits symptoms typical of a highly eutrophic lake and should show improvement if phosphorus control is instituted at Sesser.

III. LAKE AND DRAINAGE BASIN CHARACTERISTICS†

A. Lake Morphometry*:

1. Surface area: 0.43 kilometers^2.
2. Mean depth: 1.2 meters.
3. Maximum depth: >1.5 meters.
4. Volume: 0.516 x 10^6 m^3.

B. Precipitation**:

1. Year of sampling: 124.0 centimeters.
2. Mean annual: 112.3 centimeters.

---

† Table of metric conversions--Appendix B.
* Forneris, 1973.
** See Working Paper No. 175, "...Survey Methods, 1973-1976".

IV. LAKE WATER QUALITY SUMMARY

Old Ben Mine Reservoir was sampled three times during the open-water season of 1973 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from two depths at a single station on the lake (see map, page v). During each visit, a single depth-integrated (near bottom to surface) sample was collected for phytoplankton identification and enumeration, and a similar sample was taken for chlorophyll a analysis. During the first visit, a single 18.9-liter depth-integrated sample was collected for algal assays. The maximum depth sampled was 1.5 meters.

The sampling results are presented in full in Appendix C and are summarized in the following table.

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR OLD BEN MINE RESERVOIR
STORET CODE 1765

PARAMETER	1ST SAMPLING (5/11/73) 1 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (8/ 8/73) 1 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (10/18/73) 1 SITES RANGE	MEAN	MEDIAN
TEMP (C)	18.1 - 18.8	18.4	18.4	28.2 - 29.3	28.7	28.7	17.7 - 17.8	17.7	17.7
DISS OXY (MG/L)	3.8 - 3.8	3.8	3.8	3.8 - 7.6	5.7	5.7	9.6 - 9.6	9.6	9.6
CNDCTVY (MCROMO)	435. - 440.	438.	438.	122. - 123.	123.	123.	1375. - 1376.	1376.	1376.
PH (STAND UNITS)	7.5 - 7.6	7.5	7.5	7.6 - 8.3	7.9	7.9	8.0 - 8.0	8.0	8.0
TOT ALK (MG/L)	66. - 67.	67.	67.	128. - 131.	130.	130.	148. - 148.	148.	148.
TOT P (MG/L)	0.374 - 0.416	0.395	0.395	0.940 - 0.972	0.956	0.956	0.920 - 0.940	0.930	0.930
ORTHO P (MG/L)	0.333 - 0.338	0.335	0.335	0.518 - 0.672	0.595	0.595	0.632 - 0.634	0.633	0.633
NO2+NO3 (MG/L)	0.540 - 0.550	0.545	0.545	0.080 - 0.130	0.105	0.105	0.060 - 0.070	0.065	0.065
AMMONIA (MG/L)	0.310 - 0.420	0.365	0.365	0.080 - 0.120	0.100	0.100	0.060 - 0.060	0.060	0.060
KJEL N (MG/L)	1.100 - 1.100	1.100	1.100	1.200 - 2.000	1.600	1.600	1.600 - 1.900	1.750	1.750
INORG N (MG/L)	0.860 - 0.960	0.910	0.910	0.160 - 0.250	0.205	0.205	0.120 - 0.130	0.125	0.125
TOTAL N (MG/L)	1.640 - 1.650	1.645	1.645	1.280 - 2.130	1.705	1.705	1.660 - 1.970	1.815	1.815
CHLRPYL A (UG/L)	10.0 - 10.0	10.0	10.0	59.7 - 59.7	59.7	59.7	24.6 - 24.6	24.6	24.6
SECCHI (METERS)	0.5 - 0.5	0.5	0.5	0.7 - 0.7	0.7	0.7	0.5 - 0.5	0.5	0.5

B. Biological characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units per ml
05/11/73	1. Flagellates	4,759
	2. Cyclotella sp.	1,175
	3. Cylindrocystis sp.	602
	4. Scenedesmus sp.	572
	5. Mallomonas sp.	120
	Other genera	724
	Total	7,952
08/08/73	1. Oscillatoria sp.	6,855
	2. Cyclotella sp.	5,429
	3. Carteria sp.	4,362
	4. Merismopedia sp.	2,037
	5. Cryptomonas sp.	1,870
	Other genera	9,538
	Total	30,091
10/18/73	1. Stephanodiscus sp.	7,011
	2. Kirchneriella sp.	5,075
	3. Scenedesmus sp.	4,941
	4. Flagellates	3,472
	5. Cyclotella sp.	2,471
	Other genera	5,943
	Total	28,913

2. Chlorophyll a -

Sampling Date	Station Number	Chlorophyll a (µg/l)
05/11/73	01	10.0
08/08/73	01	59.7
10/18/73	01	24.6

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.348	0.870	20.9
0.050 P	0.398	0.870	23.0
0.050 P + 1.0 N	0.398	1.870	40.9
1.0 N	0.348	1.870	42.2

2. Discussion -

The control yield of the assay alga, Selenastrum capricornutum, indicates that the potential primary productivity of Old Ben Mine Reservoir was very high at the time the sample was collected. The yield resulting from the 0.050 mg/l orthophosphorus spike was not significantly different from the control, but the nitrogen only spike showed a marked increase in yield as compared to the control. Based on these results, nitrogen limitation is indicated.

The reservoir data indicate nitrogen limitation at the other sampling times as well; the mean inorganic nitrogen/orthophosphorus ratios were less than 1/1 in August and October.

V. NUTRIENT LOADINGS

Tributaries and nutrient sources were not sampled because this reservoir was included in the National Eutrophication Survey as a water body of interest to the Illinois Environmental Protection Agency.

Nutrient loads from the Village of Sesser were estimated at 1.134 kg P and 3.401 kg N/capita/year.

A. Waste Sources:

1. Known muncipal -

Name	Pop. Served*	Treatment	Mean Flow (m^3/d)**	Receiving Water
Sesser	1,700	trickling filter	643.4	Jackie Branch

2. Known industrial - None

* Anonymous, 1972.
** Estimated at 0.3785 m^3/capita/day.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/ yr
a. Tributaries (non-point load) -	
None sampled	-
b. Minor tributaries & immediate drainage (non-point load) -	-
c. Known municipal STP's -	
Sesser	1,925
d. Septic tanks - Unknown	-
e. Known industrial - None	-
f. Direct precipitation* -	10
Total	1,935

* See Working Paper No. 175.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/yr
a. Tributaries (non-point load) -	
None sampled	-
b. Minor tributaries & immediate drainage (non-point load) -	-
c. Known municipal STP's -	
Sesser	5,785
d. Septic tanks - Unknown	-
e. Known industrial - None	-
f. Direct precipitation* -	465
Total	6,250

D. Yearly Loading Rates:

	Total Phosphorus	Total Nitrogen
grams/m^2/yr	at least 4.50	at least 14.5

* See Working Paper No. 175.

VI. LITERATURE REVIEWED

Anonymous, 1972. Wastewater treatment works data book. IL Env. Prot. Agency, Springfield.

Forneris, John J., 1973. Personal communication (lake morphometry). IL Env. Prot. Agency, Springfield.

VII. APPENDICES

APPENDIX A

LAKE RANKINGS

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
1703	LAKE BLOOMINGTON	0.059	5.730	464.667	26.200	14.800	0.020
1706	LAKE CARLYLE	0.084	1.270	477.889	17.367	11.000	0.032
1708	LAKE CHARLESTON	0.160	4.680	490.667	12.000	8.400	0.065
1711	COFFEEN LAKE	0.032	0.260	456.222	7.700	14.900	0.012
1712	CRAB ORCHARD LAKE	0.082	0.200	482.222	59.867	13.800	0.013
1714	LAKE DECATUR	0.129	3.750	474.571	43.000	14.500	0.062
1725	LONG LAKE	0.704	1.190	482.667	49.333	8.800	0.398
1726	LAKE LOU YAEGER	0.186	1.600	489.583	10.662	11.400	0.076
1727	LAKE MARIE	0.098	0.370	467.667	39.533	14.700	0.057
1733	PISTAKEE LAKE	0.203	0.370	485.667	75.867	7.000	0.062
1735	REND LAKE	0.071	0.210	471.500	23.533	12.700	0.012
1739	LAKE SHELBYVILLE	0.062	3.290	461.333	17.161	14.800	0.019
1740	SILVER LAKE (HIGHLAND)	0.226	0.970	489.500	5.822	14.800	0.057
1742	LAKE SPRINGFIELD	0.108	3.265	483.385	13.013	10.800	0.059
1748	VERMILION LAKE	0.109	4.695	481.500	31.150	14.200	0.050
1750	WONDER LAKE	0.426	0.890	486.000	98.533	7.800	0.132
1751	LAKE STORY	0.072	2.510	459.333	17.250	14.800	0.021
1752	DEPUE LAKE	0.438	4.050	490.000	58.833	7.600	0.276
1753	LAKE SANGCHRIS	0.050	1.970	475.417	19.292	14.500	0.009
1754	LAKE HOLIDAY	0.167	3.135	485.167	51.217	7.200	0.046
1755	FOX LAKE	0.219	0.375	486.167	63.850	8.800	0.083
1756	GRASS LAKE	0.301	0.820	481.000	83.500	5.900	0.093
1757	EAST LOON LAKE	0.076	0.120	450.000	22.300	14.900	0.018
1758	SLOCUM LAKE	0.865	0.200	487.333	221.100	5.800	0.362
1759	CEDAR LAKE	0.029	0.170	400.333	5.767	12.800	0.013
1761	LAKE WEMATUK	0.069	1.770	466.333	7.967	14.500	0.031
1762	RACCOON LAKE	0.104	0.310	484.333	19.217	13.800	0.020
1763	BALDWIN LAKE	0.044	0.140	461.167	11.333	13.200	0.007

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
1764	LAKE VANDALIA	0.11[illegible]	0.480	478.111	11.270	[illegible].500	0.023
1765	OLD HEN MINE RESERVOIR	0.930	0.205	478.333	31.433	11.200	0.575
1766	HORSESHOE LAKE	0.127	0.705	482.833	142.250	6.300	0.01[illegible]

Reproduced from best available copy.

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
1703	LAKE BLOOMINGTON	88 (26)	0 (0)	80 (24)	47 (14)	13 (2)	68 (20)	296
1706	LAKE CARLYLE	63 (19)	40 (12)	63 (19)	63 (19)	63 (19)	53 (16)	345
1708	LAKE CHARLESTON	37 (11)	7 (2)	0 (0)	77 (23)	77 (23)	27 (8)	225
1711	COFFEEN LAKE	97 (29)	77 (23)	93 (28)	93 (28)	2 (0)	92 (27)	454
1712	CRAB ORCHARD LAKE	67 (20)	90 (27)	43 (13)	20 (6)	42 (12)	85 (25)	347
1714	LAKE DECATUR	40 (12)	13 (4)	53 (16)	33 (10)	30 (8)	32 (9)	201
1725	LONG LAKE	7 (2)	43 (13)	40 (12)	30 (9)	72 (21)	3 (1)	195
1726	LAKE LOU YAEGER	30 (9)	37 (11)	7 (2)	87 (26)	57 (17)	23 (7)	241
1727	LAKE MARIE	60 (18)	68 (20)	73 (22)	37 (11)	23 (7)	42 (12)	303
1733	PISTAKEE LAKE	27 (8)	68 (20)	23 (7)	13 (4)	90 (27)	32 (9)	253
1735	REND LAKE	77 (23)	80 (24)	70 (21)	50 (15)	53 (16)	92 (27)	422
1739	LAKE SHELBYVILLE	83 (25)	17 (5)	83 (25)	70 (21)	13 (2)	73 (22)	339
1740	SILVER LAKE (HIGHLAND)	20 (6)	47 (14)	10 (3)	97 (29)	13 (2)	42 (12)	229
1742	LAKE SPRINGFIELD	53 (16)	20 (6)	33 (10)	73 (22)	67 (20)	37 (11)	283
1748	VERMILION LAKE	50 (15)	3 (1)	47 (14)	43 (13)	37 (11)	47 (14)	227
1750	WONDER LAKE	13 (4)	50 (15)	20 (6)	7 (2)	80 (24)	13 (4)	183
1751	LAKE STORY	73 (22)	27 (8)	90 (27)	67 (20)	13 (2)	63 (19)	333
1752	DEPUE LAKE	10 (3)	10 (3)	3 (1)	23 (7)	83 (25)	10 (3)	139
1753	LAKE SANGCHRIS	88 (26)	30 (9)	67 (20)	57 (17)	30 (8)	97 (29)	369
1754	LAKE HOLIDAY	33 (10)	23 (7)	27 (8)	27 (8)	87 (26)	50 (15)	247
1755	FOX LAKE	23 (7)	63 (19)	17 (5)	17 (5)	72 (21)	20 (6)	212
1756	GRASS LAKE	17 (5)	53 (16)	50 (15)	10 (3)	97 (29)	17 (5)	244
1757	EAST LOON LAKE	70 (21)	100 (30)	97 (29)	53 (16)	2 (0)	77 (23)	399
1758	SLOCUM LAKE	3 (1)	87 (26)	13 (4)	0 (0)	100 (30)	7 (2)	210
1759	CEDAR LAKE	100 (30)	93 (28)	100 (30)	100 (30)	50 (15)	85 (25)	528
1761	LAKE WEMATUK	80 (24)	33 (10)	77 (23)	90 (27)	30 (8)	57 (17)	367
1762	RACCOON LAKE	57 (17)	73 (22)	30 (9)	60 (18)	42 (12)	68 (20)	330
1763	BALDWIN LAKE	93 (28)	97 (29)	87 (26)	80 (24)	47 (14)	100 (30)	504

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
1764	LAKE VANDALIA	47 (14)	60 (18)	60 (18)	83 (25)	13 (2)	60 (18)	323
1765	OLD BEN MINE RESERVOIR	0 (0)	83 (25)	57 (17)	40 (12)	60 (18)	0 (0)	240
1766	HORSESHOE LAKE	43 (13)	57 (17)	37 (11)	3 (1)	93 (28)	80 (24)	313

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	1759	CEDAR LAKE	528
2	1763	BALDWIN LAKE	504
3	1711	COFFEEN LAKE	454
4	1735	RENO LAKE	422
5	1757	EAST LOON LAKE	399
6	1753	LAKE SANGCHRIS	369
7	1761	LAKE WENATUK	367
8	1712	CRAB ORCHARD LAKE	347
9	1706	LAKE CARLYLE	345
10	1739	LAKE SHELBYVILLE	339
11	1751	LAKE STORY	333
12	1762	RACCOON LAKE	330
13	1764	LAKE VANDALIA	323
14	1766	HORSESHOE LAKE	313
15	1727	LAKE MARIE	303
16	1703	LAKE BLOOMINGTON	296
17	1742	LAKE SPRINGFIELD	283
18	1733	PISTAKEE LAKE	253
19	1754	LAKE HOLIDAY	247
20	1756	GRASS LAKE	244
21	1726	LAKE LOU YAEGER	241
22	1765	OLD BEN MINE RESERVOIR	240
23	1740	SILVER LAKE (HIGHLAND)	229
24	1748	VERMILION LAKE	227
25	1708	LAKE CHARLESTON	225
26	1755	FOX LAKE	212
27	1758	SLOCUM LAKE	210
28	1714	LAKE DECATUR	201

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
29	1725	LONG LAKE	195
30	1750	WONDER LAKE	183
31	1752	DEPUE LAKE	139

APPENDIX B

CONVERSIONS FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX C

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 75/10/23

176501
38 06 15.0 089 00 45.0
OLD BEN MINE RESERVOIR
17055 ILLINOIS

11EPALES
3

2111202
0008 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/05/11	12 25	0000	18.8		18	440	7.60	66	0.310	1.100	0.550	0.338
	12 25	0004	18.1	3.8		435	7.50	67	0.420	1.100	0.540	0.333
73/08/08	13 15	0000	29.3	7.6	28	123	8.30	128	0.120	2.000	0.130	0.672
	13 15	0005	28.2	3.8		122	7.60	131	0.080	1.200	0.080	0.518
73/10/18	11 19	0000	17.7		19	1376	8.00	148	0.060	1.900	0.070	0.632
	11 19	0003	17.8	9.6		1375	8.00	148	0.060	1.600	0.060	0.634

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/11	12 25	0000	0.374	10.0
	12 25	0004	0.416	
73/08/08	13 15	0000	0.940	59.7
	13 15	0005	0.972	
73/10/18	11 19	0000	0.940	24.6
	11 19	0003	0.920	